Spring 2009

Physics 203A – Physics for Scientists and Engineers

Credits: 5

Item Number: 7123

M, T, Th, F: 7:30am – 8:50am, SC 117

Instructor: Chitra Solomonson
Office: SC 220
Phone: (253) 833 9111 extn. 4868
Email: csolomonson@greenriver.edu
Web: http://www.instruction.greenriver.edu/csolomon/

Office Hours: 1:00pm to 2:00pm Tu, W, F
Noon to 1pm M, Th

Materials

- **A Three Ring Binder:** This is absolutely essential to organize your materials for this course. You will be completing many weekly homework, quizzes and class worksheets for this course. Make sure all your handouts and work completed is filed away in your binder. This valuable resource will help you to consolidate all your study material for the final exam. You need not bring the binder to class everyday.
- **A Scientific Calculator:** A TI-83 or equivalent should be more than sufficient for this course and should be part of your ‘classroom kit’.
- **Miscellaneous:** A ruler, a sharp pencil, graph paper and other small items may be specified as the need arises in the course.

Description

Phys 203 is the third of a three course sequence of Physics courses for students in the science and engineering track. We will continue our study of electricity, magnetism and electromagnetism (Chapters 25 – 31). This will be followed by a study of oscillations and the general properties of all waves (Chapters 16 and 17). We will study different kinds of waves: sound waves and electromagnetic waves (Chapters 18 and maybe parts of Chapters 34 and 36).

Physics is an experimental science. Laboratory is an integral part of the course but some topics will lend themselves better to one-hour experiments more so than others. So labs will not be evenly distributed during this course. Finally, this course satisfies the **math/science** or **lab science requirement** for AA and AS degrees.

**Prerequisites:** Grades of 2.0 or higher in Phys 202 and MATH 125 and at least concurrent enrollment in Math 126.
Instructional Method

Physics is a contact sport – you learn by doing it. In that spirit, this course is intended to be an extremely hands-on and minds-on course. The instructor will be merely a facilitator of the learning process. You, as the student, are on centerstage. It is your responsibility to participate fully in the laboratory activities and problem-solving sessions. The more you jump in to participate by asking questions, performing the lab activities and analyzing what you observe, the better your learning experience will be.

Course Content Learning Outcomes

At the end of the course, you are expected to develop quantitative and qualitative understanding of the applications of Newtonian Physics to energy, momentum, oscillations and waves as well as the study of electromagnetic theory. You should be able to

- provide detailed and accurate descriptions of Newtonian physical systems,
- solve multi-step problems in physical analysis,
- identify pertinent elements of physical systems and problems,
- design meaningful experiments and clearly report their conclusions,
- interpret scientific data including the results of experiments designed by others,
- apply the tools of calculus to the solution of complex problems,
- use electronic and numerical instruments as tools for investigation and analysis.

Course Objectives

At a higher level, the course seeks to promote the following skills that are elements of any successful career and lifestyle:

Critical Thinking: This is usually described as the process of critically examining the merits of an intellectual endeavour such as a definition, an essay, a poem or a scientific work and arriving at a judgment regarding the merits of that endeavour. It also means using this mode of thought to arrive at a conclusion, or to create new knowledge that will stand up to critical assessment, including experiments, by others. We will adopt some norms that people commonly accept while involved in critical reasoning. A good critical thinker exhibits the following characteristics:

- He/She recognizes and uses essential components of effective reasoning to evaluate information and to improve the quality of his/her own thinking.
- He/She provides reasons for the conclusions they reach and assess the relevance and adequacy of those reasons. He/She demonstrates active listening and close reading skills.
- He/She connects past learning with current topics.

You will use one or all of these qualities in almost every activity: specifically in quizzes, exams, laboratory sessions and classwork.

Quantitative and Symbolic Reasoning: This is the ability to understand and manipulate abstract mathematical representations. This includes the following specific skills:

- Value quantitative reasoning,
- Become confident in your ability to reason quantitatively,
• Use quantitative reasoning to solve problems, and
• Use quantitative reasoning to communicate.
This course will help you reach the above goals using general problem solving strategies in mechanics to understand everyday phenomena.
A person with good quantitative and symbolic reasoning skills exhibits the following characteristics:

• He/She demonstrates the ability to acquire appropriate and accurate data, to analyze and summarize this data.
• He/She demonstrates effective case study analysis.
• He/She demonstrates meaningful participation in lecture, discussion, and seminars.

Quantitative reasoning is a campus-wide learning outcome. You will develop this skill throughout the quarter as you work through numerical and conceptual problems in this course.

Assessment

The above learning outcomes will be assessed in the following ways:

• **Homework:** There will be weekly homework assignments. Typically these will be assigned Tuesdays and collected on Tuesdays. The solutions to these assignments will be posted on the web or given out as handouts on the same day as they are collected. **No late homework will be collected (okay, I know I did not enforce this absolutely last time but I will this time).** If you are unable to turn in homework on time, make sure you attempt to do the problems anyway. This will ensure that you are abreast of the material.
  
  • Homework should be done on standard 8 1/2 x 11 paper.
  • Your name, date and assignment number should be printed on the top right hand corner of the top sheet.
  • All sheets should be stapled together. You can get a small stapler for about $5.00.
  • Each solution/answer should be separated by a line.
  • No credit will be given to a Yes/No answer when the question explicitly asks for an explanation.
  • Points may be taken off if you do not adhere to the above guidelines.

• **Quizzes:** There will be a quiz every Friday (as the schedule permits) on the homework and the material covered for the week.

• **Laboratory work:** This is an integral part of the course and is integrated with the lecture meaning the experiments will be done in close conjunction with the material being learned. Physics is an experimental science and you will learn to design and set up your experiments, record your observations, analyze your data and draw conclusions from it. You are encouraged to work in a group of no more than three students during the laboratory. You are encouraged to work together to collect and analyze your data. However, each of you must submit an individual lab report. Sometimes, these individual lab reports may be signed off at the end of the class session. Laboratory work may be done on any day – there is no specific laboratory session. Instructions for the lab will be given at the beginning of class along with a lab worksheet. Points will be given not only for your recorded data and analysis but also for participation in the experiment. Points may be deducted for untidy work.
Laboratory work constitutes 20% of your grade. Attendance is critical since it may not be possible to make up missed experiments due to the pace of the course.

- **Project:** You will be working on a project in a team of three students. Part of the project grade will be assigned to a project proposal that you will have to submit early in the quarter. The project itself will be due at the end of the quarter.

- **Final Exam:** Last but not the least, comes the **cumulative** final exam. This is an opportunity for you to bring together all the skills and knowledge that you have acquired in the course. It is a critical component of your grade. **For this class the final exam will be held on Thursday, June 11 from 8am to 10am. If there is a conflict with another exam at this time, please inform the instructor at least two weeks in advance.**

**Grades**

Your grades will be calculated as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20% (the lowest quiz will be dropped)</td>
</tr>
<tr>
<td>Midterm</td>
<td>20%</td>
</tr>
<tr>
<td>Laboratory</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>10%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

You are encouraged to keep track of your grade during the course by performing the following calculation:

- Add your homework points and convert to a percentage (HW)
- Add your Test points and convert to a percentage (T)
- Add your laboratory and classwork points and convert to a percentage (L)

Then your percentage for the course at any point in the course is

\[(HW \times 0.1 + Q \times 0.2 + L \times 0.2) \times 2\]

Remember, your percentage for the course as calculated above could **decrease** as the course progresses since there will be more variables in place (more homework, quizzes, midterm and final). So keep the pressure up on yourself! The final percentage will be calculated as follows:

\[HW \times 0.1 + Q \times 0.2 + L \times 0.2 + M \times 0.2 + P \times 0.1 + F \times 0.2\]

where ‘F’ stands for your final exam percentage.

The following table gives the correlation between the % score you calculated and the decimal score.

<table>
<thead>
<tr>
<th>% Score</th>
<th>Decimal Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>86 - 95</td>
<td>3.1 - 4.0</td>
</tr>
<tr>
<td>76 - 85</td>
<td>2.1 - 3.0</td>
</tr>
<tr>
<td>66 - 75</td>
<td>1.1 - 2.0</td>
</tr>
<tr>
<td>56 - 65</td>
<td>0.1 - 1.0</td>
</tr>
</tbody>
</table>

Keep in mind, some aspects of grading are subjective, so the final grade you get in the course...
may not exactly match what you have calculated above. The instructor reserves the right to assign the final grade based on student performance in written assessments and participation in the class.

**A score below 65% will automatically receive a 0.0.**

A grade of ‘I’ will only be given in emergency situations and only if at least 75% of the work is completed satisfactorily. Note that a grade of “I” cannot be given simply to save a grade point average! There must be a reason for requesting an incomplete grade.

A grade of “P” or “NC” can only be given if requested in writing at the registrar’s office before the deadline printed in the quarterly schedule. Students should know that completion of a course with a grade of “P” is usually not considered completion of a prerequisite for another class.

Students are NOT obligated to tell their instructors when a course is being taken for a P or NC grade!

You can obtain your final grade for the course via touchtone or by using the web. Instructions can be found in the Schedule of Classes.

**Course Policies**

**Attendance and Participation:** Although there are no points explicitly allocated for attendance, classwork done in class almost everyday will be assigned points. This may include class worksheets and/or laboratory work. Please make attending every class a top priority. If you do miss a class due to unavoidable circumstances, please contact me as soon as possible and ensure that you come up to speed with the missed material. This is an intense, fast-paced course and it is very difficult to make up lost ground later in the course. Also as mentioned earlier, missing class or coming late to class will impact your participation grade.

**Reading Assignments:** You will be assigned reading assignments for every class. It is your responsibility to read before you come to class. This will help you formulate questions to ask in class. Typically, each credit hour spent in class requires at least two hours of work outside of class. Since this is a hands-on, minds-on course, lecturing will be kept to a minimum in this course. Class time will be utilized for discussions in which students are expected to be active participants. We will address topics you might have had difficulty in understanding in the course of your reading, explore everyday applications of the concepts you learned, solve problems etc. The format of this course forces you to assume responsibility for your own learning and your final grade and knowledge will depend directly on your degree of participation.

**No Disruptive Behavior:** In accordance with GRCC policy, students who disrupt the academic atmosphere of the class will be asked to leave and will be referred to an academic dean for further action. Disruptions of academic atmosphere include
- Any behavior that interferes with the ability of faculty or other students to perform the work necessary for this class.
- Comments, discussions, or actions of a racist, sexist, or otherwise degrading nature will absolutely not be tolerated.
- No Food or Drinks in the Classroom: Please refrain from bringing food and drinks in the
classroom. A few small spills can lead to a very messy classroom/laboratory.

- No cellphones: Please put your cellphone in ‘silent’ mode while in the classroom as ringing cellphones can be extremely distracting to your classmates.

**Cheating:** Students who are caught cheating will similarly be referred to an academic dean for further discipline. The results of this discipline can range from failing the assignment in question to failure of the class and probation or expulsion from GRCC. Lots of students cheat and most of them do not get caught. However, those that do are in universal agreement that cheating is not worth the risk.

Please keep in mind that you are in college to learn, and if you are cheating you are ultimately only cheating yourself out of learning and skills that you would otherwise take from this class. You don’t need to cheat to pass the class. Don’t do it.

You are encouraged to work in groups on all assignments. However, every piece of work that is submitted for grading must be individual work. For example, if you are asked to solve a problem for homework, you may discuss the strategies to solve the problem with your friends but you must present the solution with all its steps in your own handwriting. Sources must be acknowledged if you use material that is not your own. Failure to adhere to this standard may result in a lower or failing grade for an individual test, paper, or for the entire course.

**Special Needs:** Any student who needs special accommodations because of a disability, needs emergency medical information kept on hand, or requires any other special accommodations to be shared with me in the event of a building evacuation, please contact me at (253) 833-9111 extension 4868. If you need an alternative medium for communicating, or are particularly dependent on any one specific medium, please let me know before class so that appropriate accommodations can be made.

If you believe you qualify for course adaptations or special accommodations under the Americans with Disabilities Act (ADA), it is your responsibility to contact the Disabled Students Services Coordinator in the LSC and provide the appropriate documentation. If you have already documented a disability or other condition, which would qualify you for special accommodations, or if you have emergency medical information or special needs I should know about, please notify me during the first week of class. You can reach me by phone at 833-9111, extension 4868. Or, you can schedule an office appointment to meet me in the SMT Building, office number 338 during my posted office hours or at another mutually determined time. If this location is not convenient for you, we will schedule an alternative place for the meeting. If you use an alternative medium for communicating, let me know well in advance of the meeting (at least one week) so that appropriate accommodations can be arranged.
Acknowledgement of the Syllabus

I have received, read and clarified my questions regarding the syllabus for Phys 203A (Spring 2009). I understand that it is possible that some changes may be made to the syllabus and the course plan at the instructor’s discretion to suit the pace of the course. I give permission to the instructor, Chitra Solomonson, to post grades online using the PIN number ______________.

________________________  ______________________
Student’s Signature       Student’s Name